

BEST EVIDENCE TOPIC REPORTS

Towards evidence based emergency medicine: best BETs from the Manchester Royal Infirmary

Edited by K Mackway-Jones

Best evidence topic reports (BETs) summarise the evidence pertaining to particular clinical questions. They are not systematic reviews, but rather contain the best (highest level) evidence that can be practically obtained by busy practising clinicians. The search strategies used to find the best evidence are reported in detail in order to allow clinicians to update searches whenever necessary.

The BETs published below were first reported at the Critical Appraisal Journal Club at the Manchester Royal Infirmary.¹ Each BET has been constructed in the four stages that have been described elsewhere.² The BETs shown here together with those published previously and those currently under construction can be seen at <http://www.bestbets.org>³ Six topics are covered in this issue of the journal.

- The accuracy of abdominal ultrasound in paediatric trauma
- EMLA or amethocaine (tetracaine) for topical analgesia in children
- Cautery or cream for epistaxis in children
- Standard bone marrow needles or special needles for intraosseous access
- Abdominal ultrasound in the diagnosis of childhood appendicitis
- Erythrocyte sedimentation rate and septic arthritis in children

1 Carley SD, Mackway-Jones K, Jones A, *et al*. Moving towards evidence based emergency medicine: use of a structured critical appraisal journal club. *J Accid Emerg Med* 1998;15:220-2.

2 Mackway-Jones K, Carley SD, Morton RJ, *et al*. The best evidence topic report: a modified CAT for summarising the available evidence in emergency medicine. *J Accid Emerg Med* 1998;15:222-6.

3 Mackway-Jones K, Carley SD. [bestbets.org](http://www.bestbets.org): Odds on favourite for evidence in emergency medicine reaches the worldwide web. *J Accid Emerg Med* 2000;17:235-6.

The accuracy of abdominal ultrasound in paediatric trauma

Report by Ross Murphy, *Senior Clinical Fellow*
Search checked by Angaj Ghosh, *Senior Clinical Fellow*

Clinical scenario

An 8 year old boy is taken to the emergency department after falling out of a tree. He has no signs of injury apart from abrasions and tenderness across his upper abdomen; he is haemodynamically stable. He undergoes an abdominal ultrasound that is normal but you wonder how accurate this is at identifying intra-abdominal injury compared with the current gold standard, abdominal computed tomography.

Three part question

In [a paediatric patient with blunt abdominal trauma] how [accurate is an ultrasound scan] at [identifying intra-abdominal injury]?

Search strategy

Medline 1966-12/00 using the OVID interface. {[(exp child OR children.mp OR exp pediatrics OR pediatric.mp OR paediatric.mp) AND (exp abdominal injuries OR abdominal trauma.mp)] AND (exp tomography, x-ray

computed OR CT.mp OR computerised tomography.mp OR exp ultrasonography OR ultrasonography.mp OR exp ultrasonics OR ultrasonics.mp OR ultrasound.mp)} LIMIT to human AND english.

Search outcome

Altogether 511 papers found of which 505 were irrelevant or of insufficient quality. The remaining six papers are shown in table 1.

Comments

The evidence indicates a variability in the accuracy of ultrasound at identifying intra-abdominal injury in children. This is probably related to the skill of the ultrasonographer. Ultrasound can have a high diagnostic specificity and it may be useful as part of a rule in strategy in these situations. Focused abdominal sonography for trauma (FAST) seems to be neither sensitive nor specific enough.

Clinical bottom line

Abdominal ultrasound can be used to rule in intra-abdominal fluid or organ damage in children. Negative ultrasound does not rule out intra-abdominal injury and, if clinical suspicion persists, abdominal computed tomography with contrast should be performed.

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Table 1

Author, date and country	Patient group	Study type (level of evidence)	Outcomes	Key results	Study weaknesses
Krupnick AS <i>et al</i> , 1996, USA	32 children with blunt abdominal trauma and splenic injury diagnosed on abdominal CT with contrast. 32 controls.	Diagnostic test study	Splenic injury detected by USS	Sensitivity 69% Specificity 100% NPV 76%	Ultrasound done on average within 5.5 days of CT and 6.5 days of the injury. All data not given. Specificity calculated from control group, none of whom had been victims of trauma. No power study
Richardson MC <i>et al</i> , 1997, UK	26 children who had scans performed within 48 hours of blunt abdominal trauma. Abdominal CT with contrast as gold standard	Diagnostic test study	Intra-abdominal fluid or organ injury detected by USS	Sensitivity 87.5% Specificity 100% NPV 40%	Retrospective. Only 2 patients had no intra-abdominal injury implying that this sample group may have been more severely injured than most children with blunt abdominal trauma
Partrick DA <i>et al</i> , 1998, USA	100 children with blunt abdominal trauma who has abdominal ultrasound performed by an emergency physician. Abdominal CT as gold standard	Diagnostic test study	Intra-abdominal fluid or organ injury detected by USS	Sensitivity 42% Specificity 100% NPV 93%	Retrospective. Sample group selective
Mutabagani KH <i>et al</i> , 1999, USA	46 children with suspected intra-abdominal injury undergoing focussed abdominal sonography for trauma (FAST) Abdominal CT as gold standard	Diagnostic test study	Intra-abdominal fluid or organ injury detected by FAST	Sensitivity 30% Specificity 100% NPV 71%	No power study.
Benya EC <i>et al</i> , 2000, USA	51 children with blunt abdominal trauma. Abdominal CT with contrast as gold standard	Diagnostic test study	Intra-abdominal fluid or organ injury detected by USS	Sensitivity 64.7–70.6% Specificity 70.6–79.4% NPV 81.8–82.6%	Intervals between scans up to 24 hours with CT scan performed first. All data not given. No power study.
Coley BD <i>et al</i> , 2000, USA	107 children with blunt abdominal trauma undergoing focussed abdominal sonography for trauma (FAST)	Diagnostic test study	Intra-abdominal fluid or organ injury detected by FAST	Sensitivity 55% Specificity 18% NPV 50%	

- 1 Krupnick AS, Teitelbaum DH, Geiger JD, *et al*. Use of abdominal ultrasonography to assess paediatric splenic trauma. Potential pitfalls in the diagnosis. *Ann Surg* 1997;225:408–14.
- 2 Richardson MC, Hollman AS, Davis CF. Comparison of computed tomography and ultrasonographic imaging in the assessment of blunt abdominal trauma in children. *Br J Surg* 1997;84:1144–6.
- 3 Partrick DA, Bensard DD, Moore EE, *et al*. Ultrasound is an effective triage tool to evaluate blunt abdominal trauma in the pediatric population. *J Trauma* 1998;45:57–63.

- 4 Mutabagani KH, Coley BD, Zumberge N, *et al*. Preliminary experience with focussed abdominal sonography for trauma (FAST) in children: Is it useful? *J Paediatr Surg* 1999;34:48–52.
- 5 Benya EC, Lim-Dunham JE, Landrum O, *et al*. Abdominal sonography in examination of children with blunt abdominal trauma. *Am J Roentrol* 2000;174:1613–6.
- 6 Coley BD, Mutabagani KH, Martin LC, *et al*. Focused abdominal sonography for trauma (FAST) in children with blunt abdominal trauma. *J Trauma* 2000;48:902–6.

EMLA or amethocaine (tetracaine) for topical analgesia in children

Report by Russell Boyd, *Consultant*
Search checked by Michelle Jacobs, *Specialist Registrar*

Clinical scenario

A 5 year old child is to undergo venepuncture for a diagnostic blood test. You wonder if the application of Ametop (4% amethocaine gel) or EMLA (eutectic mixture of local anaesthetics (2.5% lignocaine (lidocaine) with 2.5% prilocaine)) will be better at reducing the pain of venepuncture.

Three part question

In [a 5 year old child] is [EMLA or amethocaine gel] better at [reducing the pain of venepuncture].

Search strategy

Medline 1966–12/00 using the OVID interface. [(exp tetracaine OR tetracaine.mp OR amethocaine.mp) AND (exp prilocaine OR prilocaine.mp OR EMLA.mp OR exp lidocaine OR lidocaine.mp)] AND (exp anaesthetics, combined OR exp anaesthetics, local) LIMIT to human AND english.

Search outcome

Altogether 72 papers found of which 67 were irrelevant or of insufficient quality. The remaining five papers are shown in table 2.

Comments

The studies listed are of variable quality but the trend seems to favour Ametop as the superior anaesthetic. This product may also have advantages in terms of speed of onset and vasodilatation.

Clinical bottom line

Ametop is superior to EMLA for topical anaesthesia before venepuncture in children

- 1 Lawson RA, Smart NG, Gudgeon AC, *et al*. Evaluation of an amethocaine gel preparation for percutaneous analgesia before venous cannulation in children *Br J Anaesth* 1995;75:282–5.
- 2 Van Kam HJM, Egberts ACG, Rijnvos WPM, *et al*. Tetracaine versus lidocaine-prilocaine for preventing venepuncture-induced pain in children. *Am J Health Syst Pharm* 1997;54:388–92.
- 3 Romsing J, Henneberg SW, Walther-Larson S, *et al*. Tetracaine vs EMLA cream for percutaneous anaesthesia in children. *Br J Anaesth* 1999;82:637–8.
- 4 Choy L, Collier J, Watson AR. Comparison of lignocaine-prilocaine cream and amethocaine gel for local analgesia before venepuncture in children. *Acta Paediatr* 1999;88:961–44.
- 5 Arrowsmith J, Campbell C. A comparison of local anaesthetics for venepuncture. *Arch Dis Child* 2000;82:309–10.